

Preface

The papers in this issue are about recent advances in the technology and systems that support the coordinated use of images and data through image processing—the use of electronic means to handle, store, and maintain information that has typically been on paper. The culmination of this work is described in a group of papers on the new IBM ImagePlus™ system, its architecture, components, and capabilities, and its application to business environments. We are indebted to L. C. Kingman III of the IBM Application Solutions Division in Somers, New York, for his contributions to the creation and preparation of this issue.

Businesses, governments, and organizations of all kinds are inundated with paper and similar media that must be kept in a retrievable form for long periods of time. Recent advances in technology have now made it practical to transfer these images to electronic form, thereafter processing and maintaining them exclusively in that form. These recent advances include improved power in workstations and associated peripheral equipment, enhanced communications bandwidth, enlarged capacity and improved performance for magnetic disks, and, most importantly, the introduction of effective optical disk storage.

It is expected that these technological advances will permit a dramatic decline in the amount of paper handled, with attendant declines in the relatively high costs associated with handling paper. In response to this opportunity, IBM has developed an approach embodied in the ImagePlus system. Working with customers and technologists in a variety of settings over the last several years, this system has been tested and honed into a practical application of this technology.

The first paper is a brief overview of the new climate and opportunities produced by the advent of image processing technological advances. Kingman, Lam-

bert, and Steen introduce the current situation, the approach taken by IBM, the technologies involved, and the future possibilities for integration and use of images and associated data.

In the next paper, Helms provides a thorough review of the concepts and principles that support image processing as we know it today. He separates images from graphics, defines the basic terms used to describe the field of image processing, discusses image systems and their capabilities, compares image systems with earlier approaches, and describes the operational characteristics of image systems. He also writes about how the recent technical advances have made image processing practical and affordable for the wide range of potential image applications.

The third paper, by Hakeda, summarizes the architecture that underlies the recent developments in image processing at IBM. The Image Object Content Architecture (IOCA) provides a consistent method for image representation across Systems Application Architecture™ (SAA™) and particularly across its Common Communications Support (CCS) protocols. Such an architecture is essential to both processing and transmission when networks of computers are to share images and associated data.

Over the last three years there has been a major pilot project in the use of image processing at USAA (United Services Automobile Association). That project has been a prototype bed for computer and user activities in the ImagePlus product. USAA has a classically paper-driven environment where much of the success and profitability of the company depends upon their ability to effectively process and retrieve large numbers of forms and reports. The authors, Plesums and Bartels, present the challenges, the approach, and the benefits received in converting USAA to a paperless environment. The greater part of the paper is a full discussion of the lessons learned in how to implement and use an image system in a real application.

Avers and Probst describe the USAA experience from the IBM side, showing how the product and its concepts evolved through practical application to an actual business environment. The use of systems integration in all its stages, from requirements through system delivery, was the basic means for guiding the work of IBM and USAA as the ImagePlus system evolved. The authors present systems integration as a technique and process, discuss its benefits, and describe its use in the USAA development effort.

The sixth paper provides practical and extensive insight into the communications aspects of image systems. The authors, Morris and Orth, present the requirements for image system communications as learned from experiences at USAA, Lincoln National Corporation, and Citibank. The emphasis is on early and careful planning for the communications features of such high-demand systems.

System management for an object storage hierarchy is applied by Harding, Clark, Gallo, and Tang to the large volume of data typical in an MVS/ESA™ ImagePlus system environment. The storage hierarchy discussed contains DASD and optical storage media, allowing the balancing of cost and performance. Focusing on the Object Access Method (OAM) of MVS, the authors discuss storage management concepts, address solutions to existing requirements, and highlight the implementation approach.

In the eighth paper, Anderson, Gross, Lewis, and Reimer present the challenges, rationale, and resulting design of the ImagePlus Workstation Program (IWP)—the user's window into the image processing system. They describe the three key performance criteria: subsecond image display, ten-pages-per-minute image capture, and six-pages-per-minute image printing. They then show how those criteria were met through design features and cost factors in the final system.

One of the critical functions for the use of an image system is the ability to handle and edit images and associated data at the workstation. Ryman writes about the creation of the ImagEdit® program that directly addresses and resolves those functional needs. The challenges faced included large amounts of data, complex functions, anticipation of further standards definition, anticipation of use in yet more application domains, and designing within personal computer resource constraints.

Dinan, Painter, and Rodite discuss the extensions made to the ImagePlus system for the additional needs of high-performance applications such as bank check processing. Those extensions are embodied in the High Performance Transaction System (HPTS). The authors present details of the HPTS architecture, design, implementation, and performance considerations, along with information on applications and future directions.

The eleventh paper treats the subject of optically scanned forms and the interpretation of the data on them. The authors, Casey and Ferguson, describe techniques and a resulting implementation that allow for the processing of forms where the data entered on the form may not be properly constrained to the spaces provided and where the data may be presented in many different fonts. The Intelligent Forms Processing (IFP) system includes functions such as forms modeling, form recognition, data extraction, and optical character recognition.

The ImagePlus product is available across all the systems conforming to SAA, and the next paper describes its implementation on the IBM AS/400™. An additional capability on the AS/400 is the Workfolder Application Facility (WAF), which allows work-flow management through the use and support of queues, folders of work to be done with associated images, specifications of user authority and capability, and the necessary administrative functions. Addink and Mullen show how ImagePlus and WAF are designed to work together on the AS/400 in support of midrange applications of image processing systems.

Perry, Wester, Baker, and Kemmis present the selection process and examples of several implementations of the ImagePlus system within IBM. These examples are instructive looks at how one can decide which applications are suitable for image processing, what needs to be done to prepare for implementation, and what results can be expected for the using organization.

The next issue of the *Journal* will include papers on subjects such as enterprise modeling, relational database extensions, audio visual connection for personal computers, and re-engineering of software.

Gene F. Hoffnagle
Editor